Model 1761 Multi-Octave Digitally Controlled Miniature PIN Diode Attenuator

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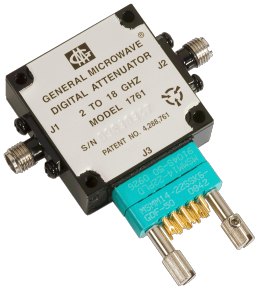
Application Notes for Microwave Attenuators

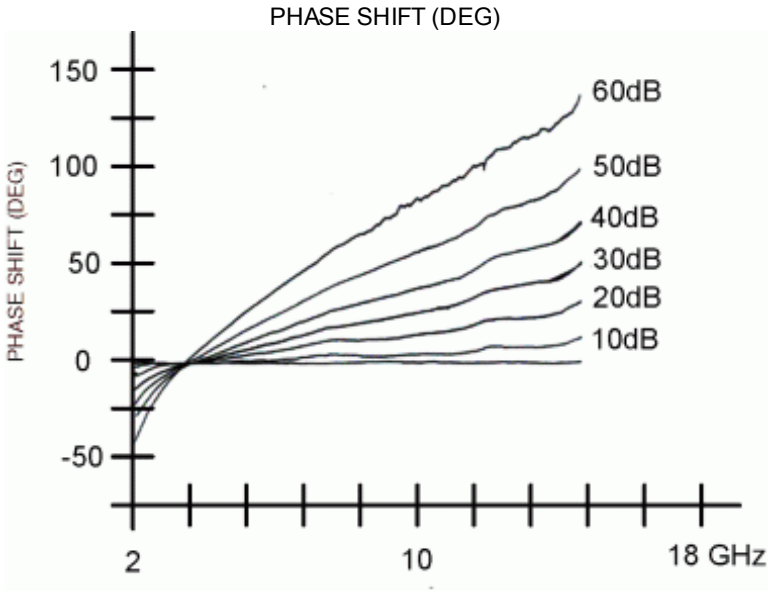
Model 1761 is a miniaturized, digitally controlled PIN diode attenuator covering the instantaneous frequency range of 2 GHz to 18 GHz. This model, measuring only 1.34" square and 0.5" thick, provides a monotonic attenuation range of 60 dB with 7-bit (0.5 dB LSB) resolution and 1 microsecond switching speed.

The Model 1761 is an integrated assembly of a dual PIN diode attenuator and a driver circuit consisting of a D/A converter and voltage-to-current converter. The unit is fully temperature compensated. The RF circuit consists of two wide band, T-pad attenuator sections in tandem. The levels of series and shunt currents required to maintain bilateral match at all frequencies is provided by the driver. This arrangement assures monotonicity over the full 2 to 18 GHz operating band at all levels of attenuation and for any programmed attenuation step.

The Model 1761 weighs approximately 1.5 oz. It is configured with SMA female RF connectors and a multipin connector for logic and power. The unit is powered by ±12 to 15V DC and the logic input is TTL compatible.

- **Miniature**
- **2 to 18 GHz**
- **7 Bit TTL**
- **Hermetically sealed**





MODEL 1761
Fig. 1- Typical phase vs. attenuation

PERFORMANCE CHARACTERISTICS

Frequency Range..... 2 to 18 GHz

Mean Attenuation Range ..... 60 dB

Insertion Loss, Max..... 4.5 dB

VSWR, max. 2.0:1

Flatness

Up to 20 dB..... ±1.0dB

Power Supply Requirements..... +12 to +15V, 100 mA
-12 to -15V, 100 mA

Power Supply Rejection..... Less than 0.1 dB/volt change in either supply

ENVIRONMENTAL RATINGS

Operating Temperature Range..... -54°C to + 110°C

Up to 40 dB..... ±1.25dB

Up to 60 dB..... ±3.0dB

Accuracy of Attenuation

0 to 20 dB..... ±1.0dB

20 to 40 dB..... ±1.5dB

40 to 60 dB..... ±2.0dB

Monotonicity..... Guaranteed

Temperature Coefficient ..... ±0.02 dB/°C

Power Handling Capability

Without Performance Degradation..... Up to 50 mW cw or peak

Survival Power..... 2 W average or peak from -65°C to +25°C; derate linearly to 800 mW at 110°C

Switching Speed

50% TTL to 90% RF..... 1.0 µsec

Programming..... 7-Bit TTL Binary

Minimum Attenuation Step..... 0.5 dB

Logic Input

Logic "O" (Bit OFF)..... -0.3 to +0.8V

Logic"1" (Bit ON)..... +2.0 to +5.OV

Input Current..... 10 µA max.

Non-Operating Temperature

Range..... -65°C to + 125°C

Humidity..... MIL-STD-202F, Method 103B, Cond. B (96 hrs. at 95%)

Shock..... MIL-STD-202F, Method 213B, Cond. B (75G, 6 msec)

Vibration..... MIL-STD-202F, Method 204D, Cond. B (.06" double amplitude or 15G, whichever is less)

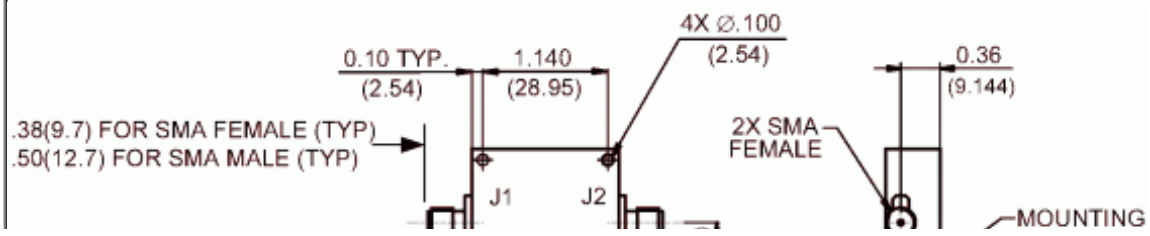
Altitude..... MIL-STD-202F, Method 105C, Cond. B (50,000 ft.)

Temp. Cycling..... MIL-STD-202F, Method 107D, Cond. A, 5 cycles

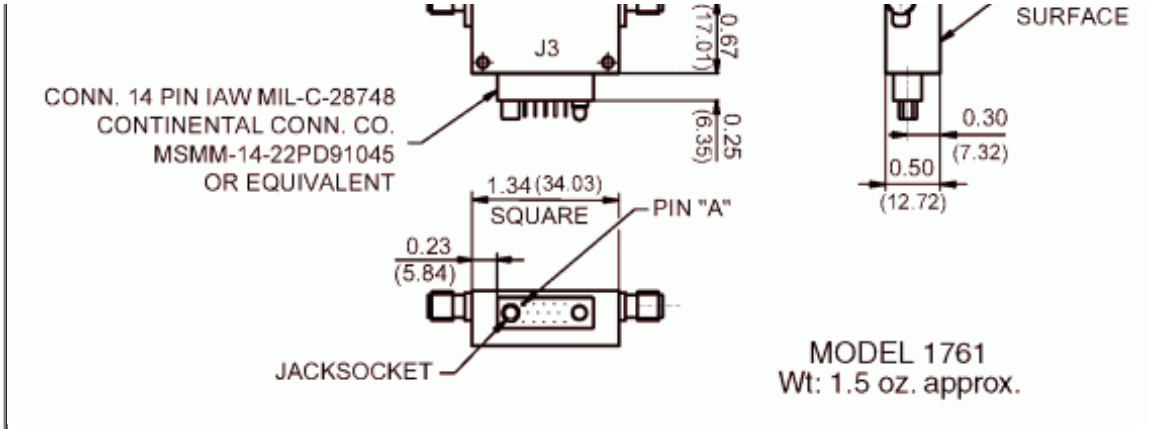
ACCESSORY FURNISHED

Mating power/logic connector

DIMENSIONS AND WEIGHT



PIN FUNCTIONS	
PIN	**FUNCTION**
A	GND
B	LSB 0.5 dB
C	+V
D	N.C.
E	1 dB
F	-V
H	N.C.
J	4 dB
K	2 dB
L	N.C.
M	16 dB
N	8 dB
P	GND.
R	32 dB



Dimensional Tolerances, unless otherwise indicated: XX ± .02; XXX ± .005

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